RED-WINGED BLACKBIRD NESTLING DEVELOPMENT

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Red-winged Blackbirds (*Agelaius phoeniceus*) breed in both wet and dry situations. At present this species is increasing and more often than formerly it nests in dry situations. If young birds are in danger of falling into water they would need to grasp the vegetation quickly and balance well or they could drown. Therefore, one may assume that there might be selection for nestlings with strong grasping feet and early ability to balance over the aquatic environment. On the other hand, those nestlings falling from or leaving a nest over dry ground would not be as likely to perish. Therefore, many individual nestlings with weaker grasping and balancing abilities might survive and the elements playing a part in natural selection of those birds with stronger feet would no longer have the same role. Over a period of several years, if the wild population of upland nesters did not freely interbreed with wetland nesters, the population of terrestrial nesters might have weaker powers of grasping and slower development of the ability of nestlings to grasp, as compared to aquatic nesters.

Fankhauser (1964) reported on the renesting and second nesting of 26 color-marked Red-winged Blackbird females. He reported one bird that first nested successfully over an upland field, built a second nest which was destroyed by a predator, and then proceeded to build a third nest 600 yards away over a marshy area. This demonstrates that in some instances Red-winged Blackbirds build a nest at one time over upland areas and at other times over an aquatic area. It would be essential to record the percentage of such cases in continuing studies. The present report is based on a study designed to discover the time of development of grasping and ability to balance in upland breeding Red-winged Blackbirds and also some of the factors effecting these characteristics.

Lea (1942) found that Cedar Waxwing nestlings were able to move their toes but not grasp objects at 2 days after hatching. Further, at 4 days, when placed on their backs, the nestlings were unable to right themselves. On the 9th day, they could support themselves on a perch.

King (1955) reported that Traill's Flycatcher (*Empidonax traillii*) nestlings sat erectly on their tarsi on day 8 and on day 10 were able to perch on a finger.

Laskey (1944) reported young Cardinals (*Richmondena cardinalis*) perching in the nest shrub when 9 days old.

METHODS

The study reported continued from 12 May to 22 July 1964. All records were taken within the city limits of Toledo, Ohio.

Behavioral and ecological associations and nestling development were recorded in detail. However, this paper will deal primarily with those aspects directly concerned with grasping and balancing of the nestlings.

I marked the location of each nest with a numbered tag and visited it once a day. When birds first hatched from eggs, they were placed on their backs to determine their ability to right themselves. If they could not right themselves on the first day, a second and third or fourth test was made on the following days.

In grasping and balancing experiments, a series of different sizes of dowels was used as the grasping or perching foothold. This allowed for uniform testing. Dowels ranged from 9 to 40 mm in circumference, with six different sizes being tried.

In the previous year I found that the perch should be a bit smaller in circumference than the potential perch that could be surrounded by a bird's toes. When birds perch, their toenails usually overlap. By measuring the distance between the tip of the third toe and the tip of the hallux on each day, a dowel can be used as the testing medium which is about 10–15 mm less in circumference than is the distance between the tip of toe three and the tip of the hallux. In previous experience I found that some species of birds first able to grasp, will do so while hanging bottom-side up. In this position, they soon weaken. In this study, if the birds could grasp the dowel for 5 seconds without falling, they were considered able to grasp. If they could balance for 5 seconds, they were considered able to balance. Nestlings were placed feet first on the dowelling to allow the toes a chance to surround it. If they failed to grasp it on the first test, they were given a second chance. These tests continued each day, but an individual nestling was only allowed two chances to grasp or balance on each day. The nestlings were not allowed to drop more than 2 inches to the hand of the investigator if they failed in their attempt to grasp or balance.

The effects of visual perception on early balancing were tested by placing a hood over the head of nestlings that could balance for the first time. The ability to balance or not balance was then recorded. Most of the young birds were banded before leaving the nest. The height of the nests from the earth surface, dimensions of the nest, and the vegetative substrate for the nests were recorded.

RESULTS

Table 1 shows the distribution of the 36 nests studied. The birds that were in the old weed-field had constructed their nests along one side of the field

Table 1
Location of Red-winged Blackbird Nests

	Old weed-field	Ditch bank	Second-growth vegetation*
Numbers	19	10	7
Per cent of total	53	28	19

* At least 75 feet from water in hedgerows, old fields, etc.

that had been wet early in the spring. By the time nests were constructed all of the water had disappeared.

Table 2 shows the per cent of nests located in different types of vegetation. Vegetation aiding in support of nests other than the principal support given in this table were black willow, wild grapevine, morning glory, panicled dogwood, American elm, blackberry, meadowsweet, burr oak, black raspberry, quack grass, brome grass, and timothy.

The distance from the earth surface to the top edge of the nest was measured in 22 nests. The mean height was 32.5 inches with a maximum of 84 inches and a minimum of 9.5 inches.

The dimensions of 24 Red-winged Blackbird nests were recorded. I compared the data of Beer and Tibbitts (1950) on aquatic-nesting blackbirds to those in this study (see Table 3).

Table 4 lists the data concerning grasping and balancing of nestlings from 15 nests. These represent all of the birds leaving the nests. Nestlings when first hatched could almost always right themselves when placed on their backs. Nine nests of birds could balance on the day that they could first grasp. Six nests of birds grasped the perching medium hanging upside down on the day previous to being able to balance.

Seven nests of blackbird young were hooded on the day they were first able to balance and then replaced on the dowelling. Most nestlings could balance when hooded. A few could not balance or balance but poorly when hooded.

The sex of nestlings as given in Table 4 was derived by the use of data supplied by Williams (1940) and Nero (1961). There were 31 females and nine males leaving the nest. This does not, however, represent all of the young hatched, for often young were taken by predators before they could be sexed and before they were able to grasp and balance.

The span between the tip of the first and third toe when able to first balance varied between 35 and 48 mm.

The variability in nesting substrate and height of nest from the ground is striking in the upland breeding blackbird as compared to those nesting in an aquatic habitat. The nest height of those breeding in cattail swamps is limited by the height of the substrate. The nest dimensions, although not

TABLE 2
VEGETATION IN WHICH RED-WINGED BLACKBIRD NESTS WERE DISCOVERED

Plant substrate	Number of nests	Per cent of total
Goldenrod	19	53
Panicled dogwood	5	14
Blackberry	3	8
Meadowsweet	2	6
American elm	2	6
Elderberry	1	3
Burr oak	1	3
Black willow	1	3
Black raspberry	1	3
Wild grapevine	1	3

highly variable, show some differences in the size of the nest cavity. The size of the nest cavity would certainly control to some extent the time at which the nestlings are pushed from the nest by crowding of siblings. The data in Table 3 show little difference in the mean nest dimensions of terrestrial- and aquatic-nesting blackbirds. The inner nest diameter of the aquatic-nesting birds was a little less but the inner depth was a little more than the terrestrial-breeding birds. A comparison of a larger sample of nests from both populations would be desirable.

Young (1963) found that mortality of Red-winged Blackbirds is greatest in nestlings. Nestlings begin crowding one another at 8–11 days of age and those which are crowded out of the nest might become victims of predators or drown in an aquatic environment. One of the factors influencing age-specific mortality in nestlings may be their ability to grasp and balance. Those nestlings unable to grasp the nesting materials or surrounding vegetation could possibly drown over a water habitat but might survive over a terrestrial environment. Ability to balance would also be of importance, for nestlings can only grasp a perch for a short time when hanging upside down. With ability to balance, nestlings would have a much better survival potential over either an aquatic or terrestrial environment. Thus, it may be significant that nestlings from nine of the 15 nests could balance when first able to grasp. In previous investigations with seven other species of altricial birds, there were no nestlings that could balance on the same day that they were first able to grasp. Perhaps this is an adaptation of the Redwing while nesting over an aquatic environment.

Wood (1938) reported that a Redwing nestling 2 or 3 days old would be likely to drown if it should tumble out of the nest. However, he found that a half-grown nestling will float and can swim to reeds to hold on. Even before

TABLE 3

NEST DIMENSIONS OF TERRESTRIAL AND AQUATIC BREEDING RED-WINGED BLACKBIRDS

	Terrestrial*		Aquatic**	
	Mean	Range	Mean	Range
Outer diameter, cm	11.7	9.5–15.0	11.9	10.4–13.0
Inside diameter, cm	7.8	7.5– 9.5	7.6	7.1– 8.4
Outer depth, cm	10.1	6.5–13.0	11.7	8.1–19.6
Inner depth, cm	6.5	5.0– 8.5	7.1	6.6– 8.1

* 24 nests.
** 22 nests—Beer and Tibbitts (1950).

they are ready to vacate the nest, they could swim readily and climb up the cattails to the nest.

Beer and Tibbitts (1950) report that when young blackbirds leave the nest, they climb about in the vegetation and swim readily when it is necessary to cross a little open water.

Even though young birds are known to be able to swim, this ability is probably dependent on the age of the subject, temperature of the water, and amount of resting substrate to which it could grasp. The development of ability to grasp and balance would allow young birds to climb about on the vegetation and escape some predators and to escape the water, enhancing survival.

TABLE 4

DEVELOPMENT OF GRASPING AND ABILITY TO BALANCE IN NESTLING BLACKBIRDS

Number of birds in nest	Sex ratio	Day when able to grasp	Day when able to balance	Balance when hooded
4	4 F	–	7	Poor
4	4 F	7	8	–
4	3 F, 1 M	–	8	–
2	2 M	–	9	*
2	2 F	8	9	Good
4	4 F	8	9	Good
2	1 F, 1 M	8	9	–
4	2 F, 2 M	8	9	–
4	4 F	–	9	–
3	2 F, 1 M	–	9	–
1	1 F	8	9	–
1	1 M	–	9	–
1	1 F	–	8	Good
3	2 F, 1 M	–	9	Good
1	1 F	–	8	Good

* Could not balance after hooded.

SUMMARY

Thirty-six upland breeding Red-winged Blackbird nests were discovered in Toledo, Ohio, 19 of which were in old weed-fields, 10 along ditch banks, and seven in second-growth vegetation.

The primary nest substrate consisted of 10 different kinds of vegetation. Often there was a second or third species of plant assisting as nest supports. A great deal of variation was found in the nest dimensions and in the height of the nest from the ground.

Most nestlings were able to grasp by the eighth or ninth day. More than half of them could balance on the day that they could first grasp. When a hood was placed over the head of nestlings when first able to balance, they had difficulty in balancing but most of them could still balance.

Ability of nestlings to grasp and balance may have a direct influence on age-specific mortality.

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